In the Claims:

1. (Previously Amended) A method for carrying out a catalysis reaction in carbon dioxide, said method comprising:

contacting a fluid mixture with a catalyst bound to a polymer, the fluid mixture comprising at least one reactant and carbon dioxide, wherein the reactant interacts with the catalyst to form a reaction product, and wherein the polymer is soluble in carbon dioxide.

2. (Original) The method according to Claim 1, wherein the carbon dioxide is gaseous carbon dioxide.

3. (Original) The method according to Claim 1, wherein the carbon dioxide is liquid carbon dioxide.

4. (Original) The method according to Claim 1, wherein the carbon dioxide is supercritical carbon dioxide.

5. (Original) The method according to Claim 1, wherein said contacting step comprises a reaction taking place selected from the group consisting of a hydrogenation reaction, a hydroformylation reaction, a epoxidation reaction, and a carbon-carbon coupling reaction.

6. (Original) The method according to Claim 1, wherein the catalyst comprises a transition metal.

7. (Original) The method according to Claim 6, wherein the transition metal is selected from the group consisting of ruthenium, rhodium, palladium, platinum, vanadium, molybdenum, and a fluorous-soluble material.

8. (Original) The method according to Claim 1, wherein the catalyst is an enzymatic catalyst.

9. (Previously Amended) The method according to Claim 8, wherein the enzymatic catalyst is selected from the group consisting of alcohol dehydrogenases, alcohol oxidase, aldolase, phosphatases, alpha-chymotrypsin, asparaginase, anhydrase, catalase, creatine kinase, glutaminase, oxidases, lipases, luciferase, urease, hydratase, peroxidase, subtilisin Carlsberg and BPN', thermolysin, superoxidase, nitrileamidase, esterases, transaminase, trypsin, fumarase, amidase, acylase, peptidases, carboxylases, RNAses, glycolases, transeferases, enzymes, and mixtures thereof.

10. (Cancelled)

11. (Previously Amended) The method according to Claim 1, wherein the polymer comprises at least one carbon dioxide-philic group.

12. (Original) The method according to Claim 11, wherein the carbon dioxide-philic group comprises a group selected from a silicone-containing group and a fluorine-containing group.

13. (Original) The method according to Claim 11, wherein the carbon dioxide-philic group comprises a fluoropolymer derived from acrylate or methacrylate monomers.

14-17. (Cancelled)

18. (Original) The method according to Claim 1, wherein the catalyst is bound to a ligand which is bound to the polymer at a plurality of locations along the chain of the polymer.

19. (Original) The method according to Claim 18, wherein the ligand is selected from the group consisting of β-diketone, phosphate, phosphite, salen, bis imine, pyridine-bisimine, imidazole, pyrazolyl borate, pyridine, bi- and tripyridine, porphyrin,

phthalocyanine, cyclopentadienyl, phosphonate, phosphinic acid, phosphine, thiophosphinic acid, dithiocarbamate, amino, ammonium, hydroxyoxime, hydroxamic acid, calix(4)arene, macrocyclic , crown ether, 8-hydroxyquinoline, picolylamine, thiol, carboxylic acid ligands, chiral ligands, monodentate ligands, polydentate ligands, and mixtures thereof.

20. (Original) The method according to Claim 1, wherein the at least one reactant is selected from the group consisting of an olefin, hydrogen, carbon monoxide, an oxidant, oxygen, an aryl halide, a tin reagent, and a silylating reagent.

21-48. (Cancelled)

49. (Previously Added) The method of Claim 11, wherein the carbon-dioxide philic group comprises a fluoropolymer.

50. (Previously Added) A method for carrying out a catalysis reaction in carbon dioxide, said method comprising:

contacting a fluid mixture with a catalyst bound to a polymer, the fluid mixture comprising at least one reactant and carbon dioxide, wherein the reactant interacts with the catalyst to form a reaction product, and wherein the polymer is insoluble and swellable in carbon dioxide.

51. (Previously Added) The method according to Claim 50, wherein the carbon dioxide is gaseous carbon dioxide.

52. (Previously Added) The method according to Claim 50, wherein the carbon dioxide is liquid carbon dioxide.

53. (Previously Added) The method according to Claim 50, wherein the carbon dioxide is supercritical carbon dioxide.

54. (Previously Added) The method according to Claim 50, wherein said contacting step comprises a reaction taking place selected from the group consisting of a hydrogenation reaction, a hydroformylation reaction, a epoxidation reaction, and a carbon-carbon coupling reaction.

55. (Previously Added) The method according to Claim 50, wherein the catalyst comprises a transition metal.

56. (Previously Added) The method according to Claim 55, wherein the transition metal is selected from the group consisting of ruthenium, rhodium, palladium, platinum, vanadium, molybdenum, and a fluorous-soluble material.

57. (Previously Added) The method according to Claim 50, wherein the catalyst is an enzymatic catalyst.

58. (Previously Added) The method according to Claim 57, wherein the enzymatic catalyst is selected from the group consisting of alcohol dehydrogenases, alcohol oxidase, aldolase, phosphatases, alpha-chymotrypsin, asparaginase, anhydrase, catalase, creatine kinase, glutaminase, oxidases, lipases, luciferase, urease, hydratase, peroxidase, subtilisin Carlsberg and BPN', thermolysin, superoxidase, nitrileamidase, esterases, transaminase, trypsin, fumarase, amidase, acylase, peptidases, carboxylases, RNAses, glycolases, transeferases, enzymes, and mixtures thereof.

59. (Previously Added) The method according to Claim 50, wherein the polymer is formed from at least one monomer selected from the group consisting of styrenics, α-olefins, ethylene oxides, dienes, amides, esters, sulfones, sulfonamides, imides, thiols, alcohols, diols, acids, ethers, ketones, cyanos, amines, quaternary ammonium salts, acrylates, methacrylates, thiozoles, and mixtures thereof.

60. (Previously Added) The method according to Claim 50, wherein the polymer is a copolymer formed from monomers selected from the group consisting of styrenics, α-olefins, ethylene oxides, dienes, amides, esters, sulfones, sulfonamides, imides, thiols, alcohols, diols, acids, ethers, ketones, cyanos, amines, quaternary ammonium salts, acrylates, methacrylates, thiozoles, 2-(N-ethylperfluorooctane- sulfonamido) ethyl acrylate, 2-(N-ethyl perfluorooctane-sulfonamido) ethyl methacrylate, 2-(N-methylperfluoro octane- sulfonamido) ethyl acrylate, 2-(N-methylperfluorooctane- sulfonamido) ethyl methacrylate, 1,1'-dihydroperfluorooctyl acrylate, 1,1'-dihydroperfluoro octyl methacrylate, 1,1',2,2'-tetrahydroperfluoroalkylacrylate, 1,1',2,2'-tetrahydroperfluoroalkyl- methacrylate, α-fluorostyrene, 2,4,6-trifluoromethylstyrene, hexafluoropropylene oxide, perfluorocyclohexane oxide, tetrafluoroethylene, vinylidine fluoride, chlorotrifluoroethylene, perfluoro(propyl vinyl ether), perfluoro(methyl vinyl ether), alkyl siloxanes, fluoroalkyl siloxanes, chloroalkyl siloxanes, and mixtures thereof.

61. (Previously Added) The method according to Claim 50, wherein the polymer is a copolymer formed from a fluoroacrylate monomer and a monomer selected from glycidyl methacrylate and styrene.

62. (Previously Added) The method according to Claim 50, wherein the catalyst is bound to a ligand which is bound to the polymer at a plurality of locations along the chain of the polymer.

63. (Previously Added) The method according to Claim 62, wherein the ligand is selected from the group consisting of β-diketone, phosphate, phosphite, salen, bis imine, pyridine-bisimine, imidazole, pyrazolyl borate, pyridine, bi- and tripyridine, porphyrin, phthalocyanine, cyclopentadienyl, phosphonate, phosphinic acid, phosphine, thiophosphinic acid, dithiocarbamate, amino, ammonium, hydroxyoxime, hydroxamic acid, calix(4)arene, macrocyclic , crown ether, 8-hydroxyquinoline, picolylamine, thiol, carboxylic acid ligands, chiral ligands, monodentate ligands, polydentate ligands, and mixtures thereof.

64. (Previously Added) The method according to Claim 50, wherein the at least one reactant is selected from the group consisting of an olefin, hydrogen, carbon monoxide, an oxidant, oxygen, an aryl halide, a tin reagent, and a silylating reagent.